

33. (Currently Amended) The apparatus of claim ~~19~~ 37, further comprising of a roller operating submerged inside a bath of molten metal, such as a zinc-pot in a steel-mill galvanizing line.

34. (Currently Amended) The apparatus of claim ~~19-37~~, further comprising of at least one thin cylindrical tube within the contained volume of the roller having a mass density less than that of the fluid in which the roller is submerged for the purpose of increasing roller buoyancy to reduce bearing load and wear rate and the possibility of roller stoppage.

35. (Currently Amended) The apparatus of claim ~~19~~, 37 further comprising of increasing roller buoyancy by attaching one or more low density sealed cylindrical tubes along the roller inside wall.

36. (Currently Amended) The apparatus of claim ~~19~~ 37, further comprising of an added thin cylindrical sleeve to streamline the gap region in between the rotating roller and stationary shaft.

37. (New) A conveyor type roller comprising a substantially hollow cylinder supported by a stationary and fixed shaft so as to be substantially non-deflecting in order to maintain an alignment of the sleeve-type bearing housings which are attached to the roller.

REMARKS

The specification has been amended to correct those errors noted by the examiner.

Abstract

The abstract of the disclosure was objected to because it contains two paragraphs, instead of the accepted one paragraph.

Kindly amend the abstract to one paragraph as follows:

"Rollers used on conveyors and inside the zinc-pot of a steel-sheet galvanizing line are usually driven by friction between the roller and the belt or sheet. To keep rollers from stalling the bearing diameter is minimized. The allowable bending stress in the bearing shaft limits its length. Rollers operating in high temperature furnaces or in a hot zinc pot of a steel galvanizing line often have limited or non-existent bearing lubrication. In such cases, bearings of small diameter and limited length result in high contact

of operation. Most of these bearings are designed to have a stationary bearing housing with the roller shaft rotating inside. For small diameter rollers such shafts are an integral part of the roller. For cylindrical shell type rollers, short shafts are welded to plugs, which are then welded to each end of the roller. The herein disclosed "Bearing Life Extender For Conveyor Type Rollers" utilizes bearings which are smaller in diameter and longer, without an increase in shaft bending moment. This is made possible by changing from a rotating cantilevered shaft to a stationary shaft strengthened to be substantially non-deflecting on either side of the bearings. Such a stationary shaft can be smaller in diameter to reduce bearing friction torque and small problems. In addition such a shaft can have increased bearing contact area and assure bearing alignment, all of which contribute to increased bearing life.

(35 claims of which 3 are independent claims, 1 drawing sheet)

Drawings

The drawing objection is noted and is corrected with a new drawing submitted herewith.

Claim rejections 35 USC §102

Claims 19-26, 28-30, 32-33, and 36 were rejected under 35 U.S.C. 102(b) as being anticipated by Cook (U.S. Pat. 5, 234, 100).

The Cook reference (U.S. Pat. 5, 234, 100) shows a pre-loaded, pre-fabricated, resiliently biased ball or roller bearings.

New Claim 37 recites, "A conveyor type roller comprising a substantially hollow cylinder supported by a stationary and fixed shaft so as to be substantially non-deflecting in order to maintain an alignment of the sleeve-type bearing housings which are attached to the roller." This language distinguishes over Cook under Section 102 because Cook does not show sleeve-type bearings.

Therefore applicant respectfully asserts that Cook does not teach sleeve type bearings. Because Cook does not teach this claim limitation, applicant respectfully submits that

amended claim 1 is not anticipated by Cook and is in condition for allowance. *See, e.g.,* MPEP § 2131; *Verdegaal Bros. v Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Circ. 1987) ("A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."); *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Circ. 1989) (The identical invention must be shown in as complete detail as is contained in the ... claim.") Therefore applicant submits that Claim 37 is allowable over the cited references and requests reconsideration and allowance.

Claims 20-26, 28-30, 32, 33 and 36 are dependent claims incorporating all the limitations of independent Claim 37, and are patentable for the same reasons given with respect to Claim 37. Withdrawal of the rejection of these claims under 35 USC § 102 is respectfully requested.

Claim Rejections – 35 USC § 112

Claim 30 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly out and distinctly claim the subject matter which applicant regards as the invention.

Claim 30 was amended to recite, "*The apparatus of claim 37, further comprising of using tapered bearings to allow the sleeve type bearing housings to absorb both radial and axial thrust loads.*" This recitation makes the claim more clear and understandable by distinctly identifying the sleeve type bearing housings.

Claim 31 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly out and distinctly claim the subject matter which applicant regards as the invention.

Claim 31 was amended to recite, "*The apparatus of claim 37, further comprising of centering each bearing housing within the roller by means of vane like radial ribs which act as pump impeller vanes so as to motivate fluid surrounding the roller to flow in the radial direction through ports within both the hollow roller wall and the rotating bearing housing, for the purpose of bearing cooling or lubrication.*" This recitation makes the claim more clear and understandable by distinctly identifying the fluid surrounding the roller.

Non-Applied References

Cited, but non-applied references have been reviewed by applicant. Applicant contends that as amended claims are not now shown by these non-applied references because they do not teach sleeve-type bearings

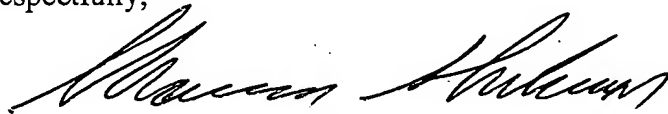
Conditional Request for Constructive Assistance

Applicant has amended the specification and claims of this application so that they are proper, definite, and define novel structure which is also unobvious. If for any reason this application is not believed to be in full condition for allowance, applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P § 2173.02 and § 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Conclusion

For all the reasons given above, applicant respectfully submits that the errors in the specification are corrected, that the claims now comply with Section 112 and that the claims now define over the prior art under Section 102. Accordingly, applicant submits that this application is now in full condition for allowance, which applicant respectfully requests.

Very respectfully,



Shannon Sheehan
Representative for Assignee

WVURC
Office of Technology Transfer
Chestnut Ridge Research Building
886 Chestnut Ridge Rd. -2nd floor
PO Box 6216
Morgantown, WV 26506-6216